EUGENE OUTLOOK WATER CORPORATION (PWS #4010054)
SOURCE WATER ASSESSMENT FINAL REPORT

February 20, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the federal Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. The assessment for your particular system is based on a land use inventory of the designated source water area, sensitivity factors associated with each well, and characteristics of the aquifer that supplies your community with drinking water.

This report, *Source Water Assessment for the Eugene Outlook Water Corporation, located in Boise, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within those boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Eugene Outlook Water Corporation (PWS #4010054) drinking water system consists of a single well. Well #1 rated an overall moderate susceptibility to inorganic (IOCs), volatile organic (VOCs), synthetic organic (SOCs) and microbial contaminants. This rating can be attributed, in part to the predominant land use in the region, which is urban/commercial. Additionally, numerous potential contaminant sources within the designated source water area slightly elevated the overall ratings (Table 1, page 20).

The well has not recorded the presence of SOCs or VOCs during any water chemistry tests. The IOCs barium, nitrate, and fluoride have been discovered in the drinking water, but at levels below each respective maximum contaminant level (MCL). Nitrate levels have never exceeded 1.0 milligrams per liter (mg/L), never jeopardizing the MCL for nitrate, which is 10.0 mg/L.

The system has tested positive for total coliform bacteria several times since October of 2000. One of these samples subsequently tested positive for *E. coli* as well. Since all of these samples came from the distribution system, it is unknown whether the bacteria originated from contaminated source water, or due to a problem somewhere within the distribution system. In addition, in April of 1996, a routine arsenic test indicated arsenic concentrations in the drinking water of 14 parts per billion (ppb). In December of 1999, arsenic levels were a bit lower, at 11 ppb. Both of these test results exceed the revised MCL for arsenic of 10 ppb. The arsenic MCL was recently lowered by the EPA from 50 ppb to 10 ppb (October 31, 2001), allowing water systems until 2006 to comply with the new standard.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the Eugene Outlook Water Corporation, drinking water protection activities should first focus on continued maintenance of the sanitary seal and distribution system. Actions should also be taken to keep a 50-foot radius circle clear around the wellhead. Any spills occurring within the delineated drinking water capture zone should be monitored and dealt with expeditiously.

Because a portion of the ground water capture zone is outside the direct jurisdiction of the Eugene Outlook Water Corporation, the creation of partnerships with state and local agencies and industry groups are critical to the success of drinking water protection. The water system may want to cooperate with the businesses within the delineation to encourage the use of pollution prevention methods and specific best management practices (BMPs). In addition, if microbial contamination should become a persistent problem, appropriate disinfection practices would need to be implemented to ensure the health of the Eugene Outlook Water Corporation residents.

Also, because of the new, more rigid arsenic standard, the system may want to take proactive measures to prepare for the new MCL of 10 ppb. Compliance with the new arsenic MCL will be required for all water systems by 2006. Recent documentation from the EPA indicates that federal monies will likely be available to assist small water systems in implementing engineering controls to meet the new standard. More information can be obtained from the EPA website (http://www.epa.gov).

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan, especially since the delineation contains some urban and residential land uses. Public education topics could include proper lawn care practices, household hazardous waste disposal methods, and the importance of water conservation to name but a few.

There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. In addition, because the delineation envelops many roads in the downtown Boise region, the Idaho Department of Transportation should be involved in any protection measures. Drinking water protection practices dealing with agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Ada County Soil Conservation District, and the Natural Resources Conservation Service.

A community should incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, water conservation, specific best management practices). For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality at 373-0550 or the Idaho Rural Water Association at 1-800-962-3257.

SOURCE WATER ASSESSMENT FOR THE EUGENE OUTLOOK WATER CORPORATION, BOISE, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are contained in this report (Attachment A, pages 17-20). The list of significant potential contaminant source categories and their rankings used to develop the assessment is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess each drinking water source in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act Amendments of 1996. This assessment is based on a land use inventory of the delineated source water area, sensitivity factors associated with each well, and aquifer characteristics. Since there are over 2,900 public water sources in Idaho, there is limited time and resources available to accomplish the assessments. All of these assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Eugene Outlook Water Corporation has a community public drinking water system serving approximately 30 people that is located in Ada County near the corner of Castle Road and Pierce Park Lane in Boise, Idaho (Figure 1, page 18). Residents receive their water from a single well.

The primary water quality issue currently facing the Eugene Outlook Water Corporation is the recent repeat detection of total coliform bacteria within the distribution system. In October of 2000, total coliform bacteria were identified in a routine water sample pulled from the distribution system. Follow up testing four days later again tested positive. One of these repeat samples also tested positive for *E. coli.* The system was then bacteria free until May of 2001, when several routine and repeat samples again tested positive for total coliform bacteria. All ensuing tests, this time, were negative for *E. coli.* The presence of bacteria, especially *E. coli*, constitutes a health risk to the residents of the Eugene Outlook Water Association, and therefore should be closely monitored.

In April of 1996, a routine arsenic test indicated arsenic concentrations in the drinking water of 14 ppb. In December of 1999, arsenic levels were a bit lower, at 11 ppb. Both of these test results exceed the revised MCL for arsenic of 10ppb. The arsenic MCL was recently lowered by the EPA from 50ppb to 10ppb (October 31, 2001), allowing water systems until 2006 to comply with the new standard.

The well has not recorded the presence of SOCs or VOCs during any water chemistry tests. The IOCs barium, nitrate, and fluoride have been discovered in the drinking water, but at levels below each respective MCL. Nitrate levels have never exceeded 1.0 mg/L, never jeopardizing the MCL for nitrate, which is 10.0 mg/L.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (regions indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. DEQ contracted with BARR Engineering to perform the delineations using a combination of MODFLOW and a refined analytical element computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Boise Valley aquifer. The computer model used site specific data, assimilated by BARR Engineering from a variety of sources including area well logs, the Treasure Valley Hydrologic Project, and hydrogeologic reports (detailed below in Section 3).

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with these possible contamination sources, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in October and November of 2001. The first phase involved identifying and documenting potential contaminant sources within the Eugene Outlook Water Corporation source water assessment area (Figure 2, page 19) through the use of computer databases and Geographic Information System maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the system representative, Mary Beth Johnson, to validate the sources identified in phase one and to add any additional potential sources in the area.

The delineated source water area contains several sources that warrant concern. Within the 3-year TOT zone, lies a historical leaking underground storage tank (LUST). Although the LUST has subsequently been remediated and removed, the impact from leaking petroleum products is unknown. Also, according to the 1996 Ground Water Under Direct Influence (GWUDI) field survey, a city sewer line passes within 161 feet to the east of the well bore. For the purposes of the susceptibility analysis, this sewer line was included as a possible source of IOCs (nitrates) and microbes.

Within the 6-year TOT zone, there are several businesses including a trucking company that is regulated under the Resource Conservation Recovery Act (RCRA). RCRA sites are required to track the generation, transport, storage, and disposal of hazardous wastes. This is also known as the "cradle to grave" management approach. Inside the 10-year TOT zone, there is another historical LUST site, in addition to several businesses and an additional site under regulation from RCRA.

All of the potential contaminant sites located within the delineated drinking water capture zone are listed, along with the class of contaminants stored at each site in Table 1 of this report (page 20).

Section 3. Hydrologic Conditions of the Treasure Valley

Treasure Valley Hydrologic Project Information (Petrich and Urban, 1996; Neely and Crockett, 1998; Petrich et al., 1999)

The "Treasure Valley" is a geopolitical region that includes the lower Boise River sub-basin. The lower Boise River sub-basin begins where the Boise River exits the mountains near the Lucky Peak Reservoir. From Lucky Peak Dam the lower Boise River flows about 64 (river) miles northwestward through the Treasure Valley to its confluence with the Snake River. The Treasure Valley Hydrologic Project area encompasses the lower Boise River area, and extends south to the Snake River. The southern area is included in the study area because of ground water flow from the Lower Boise River basin south toward the Snake River.

Significant amounts of desert area were converted to flood irrigated agriculture beginning in the 1860s. Irrigation led to increases in shallow ground water levels in some regions. These shallow ground water levels provided an inexpensive and readily obtainable source of water supply that is used extensively throughout the valley. Much of the population growth in the Treasure Valley has been occurring in previously flood-irrigated agricultural areas, resulting in increased pumpage and a reduction in local aquifer recharge. In addition, irrigation in some areas has become more efficient, reducing the amount of irrigation-related infiltration. Decreasing aquifer recharge and increasing pumpage is thought to be contributing to the decline of ground water levels in some areas.

The Treasure Valley experiences a temperate and arid-to-semiarid climate. Average high temperatures range from about 90°F in summer to 36°F in winter; low temperatures range from about 20°F in winter to about 56°F in summer. The average precipitation ranges from about 8 to 14 inches throughout most of the valley, most of which falls during the colder months in the form of snow in higher elevations and rain in the low-lying valleys.

Major surface water bodies include the Boise River, Lake Lowell, and Lucky Peak Reservoir. The primary source of surface water in the Treasure Valley is the high elevation area in the Boise River basin upstream of Lucky Peak Dam. Much of the spring runoff from the snow pack in high elevation areas is stored in three reservoirs: Anderson Ranch Reservoir, Arrowrock Reservoir, and Lucky Peak Reservoir.

Regional cropland is irrigated primarily with surface water through an extensive network of reservoirs and canals. The first canals were constructed in the 1860's; there are now over 1,100 miles of major and intermediate canals in the Treasure Valley, the majority of which are owned and maintained by canal companies and irrigation districts. Primary sources of irrigation water in the Treasure Valley include the Boise, Snake, and Payette Rivers.

Hydrogeology (from Petrich et al., 1999)

The lower Boise River sub-basin (Treasure Valley) is located within the northwest-trending topographic depression known as the western Snake River Plain. The western Snake River Plain is a relatively flat lowland separating Cretaceous granitic mountains of west-central Idaho from the granitic/volcanic Owyhee mountains in southwestern Idaho. The western Snake River Plain extends from about Twin Falls, Idaho northwestward to Vale, Oregon. The Snake River Plain is about 30 miles wide in the section containing the lower Boise River.

Historically, sediments originating from the surrounding mountains began accumulating on top of thick, basal basalts. Rifting and continued subsidence maintained the lowland topography, leading to the additional accumulation of water and sediments (Othberg, 1994). Basin infilling by sediments and basalt occurred from the late Miocene through the late Pliocene (Othberg, 1994). Incision caused by flowing water in major drainages (e.g., Snake and Boise Rivers) began in the late Pliocene or early Pleistocene, although deposition of coarse sediments continued during Quaternary glaciations (Othberg, 1994).

Several Quaternary basalt flows have been described in the western Snake River Plain, and have been assigned to the upper Snake River Group (Malde, 1991; Malde and Powers, 1962). Lava flowed across portions of the ancestral Snake River Valley (Malde, 1991) in an area that is now south of the Boise River. The Snake River then changed course, incising at its present location along the southern margin of the basalt flows. More recent eruptions (from Kuna Butte and other local sources) spilled lava into the canyon south of Melba. The Snake River has since incised this basalt (Malde, 1991).

The general stratigraphy of the western Snake River Plain consists of (from top to bottom) a thick layer of sedimentary deposits underlain by a thick series of basalt flows, which in turn are underlain by older, tuffaceous sediments and basalt (Malde, 1991; Clemens, 1993). The upper thick zone of sediments (up to approximately 6,000 feet thick) distinguishes the western Snake River Plain from the eastern Snake River Plain, in which the upper section is primarily Quaternary basalt (Wood and Anderson, 1981).

The uppermost sediments and basalt belong to the Pleistocene-age Snake River Group. The Snake River Group consists of terrace sediments, Quaternary alluvium, and Pleistocene basalt flows (Wood and Anderson, 1981). Snake River Group sediments and basalts cover much of the project area (Othberg and Stanford, 1992).

The Snake River Group overlies the Idaho Group sediments. The Idaho Group sediments can be divided into two general parts (Wood and Anderson, 1981). The lower Idaho Group contains sediments described as lake and stream deposits of buff white, brown, and gray sand, silt, clay, diatomite, numerous thin beds of vitric ash, and some basaltic tuffs. The upper part of the lower Idaho Group also contains some local, thin, basalt flows. The upper Idaho Group consists of sands, claystones, and siltstones, but differs from the lower Idaho Group in that it contains a greater percentage of coarser-grained materials. The upper Idaho Group sediments are associated with a fluvial/deltaic/lacustrine depositional environment; the lower Idaho Group sediments were deposited in more of a lacustrine/deltaic environment (Wood, 1994).

Wood (1994) identified a buried lacustrine delta within the Idaho Group sediments in the Nampa-Caldwell area. The location of the delta in the middle of the western Snake River Plain suggests that the eastern part of the Boise River basin was delta plain and flood plain at the time of deposition, while the western part was a deep lake environment. The delta probably prograded northwestward into a lake basin 830 feet deep, based upon high resolution seismic reflection data and resistivity log interpretations. The delta-plain and front sediments were shown to be mostly fine-grained, well-sorted sand with thin layers of mud (Wood, 1994). The northwest trend of the delta indicates a sediment source to the southeast, such as where the Snake River flows today (Wood, 1994).

A substantial, laterally extensive layer of clay is found at depths of 300 to 700 feet below ground surface. The clay is important because it represents, in some areas, a significant aquitard separating shallow overlying aquifers from deeper zones. The clay, often described in well logs as having a blue or gray color, has been observed as far west as Parma, and as far east as Boise (although the clay is not found in the extreme eastern portions of the Treasure Valley). The clay varies from a few feet to a few hundred feet in thickness. Although significant layers of clay are present throughout the Idaho Group sediments, individual clay units are not necessarily continuous over large areas. Also, the top of the clay can vary in elevation by up to approximately 200 feet in some locations, such as in an area west of Lake Lowell. In general, sediments above the "blue clay" are coarser-grained than the interbedded sands, silts, and clays underlying the "blue clay."

The top of the upper Idaho Group is marked in several parts of the Treasure Valley by a widespread fluvial gravel deposit known as the Tenmile gravels. Tenmile gravels contain rounded granitic rocks and felsic porphyries originating from the Idaho Batholith to the north and northeast. The Tenmile gravels range up to 500 feet in thickness along the Tenmile Ridge south of Boise, but are less than 50 feet thick in the Nampa-Caldwell area (Wood and Anderson, 1981).

Aquifer Systems and Hydrogeologic Characteristics

Ground water for municipal, industrial, rural domestic, and irrigation uses in the Treasure Valley is drawn almost entirely from Snake River Group and Idaho Group aquifers. Many domestic wells draw water from shallow aquifers, such as those in the Snake River Group deposits. Larger production wells (for municipal and agricultural uses) draw water from the deeper Idaho Group sediments.

Aquifers contained in the Snake River and Idaho Group sediments comprise shallow and regional ground water flow systems. Shallow aquifers contained in Snake River Group sediments and basalts may belong to local flow systems. Most local flow system recharge stems from irrigation infiltration and channel (e.g., streams or canals) losses. Discharge from shallow, local flow systems often is to local drains or streams. The time from recharge to discharge in shallow flow systems (residence times) probably ranges from days to tens of years.

In contrast, regional ground water flow systems extend much deeper than local flow systems. The Treasure Valley regional flow system begins in the eastern part of the valley, as indicated by downward hydraulic gradients in the Boise Fan sediments (Squires et al., 1992). Some water also enters the regional flow system as underflow from the Boise Foothills in the northeastern part of the valley. The regional flow system is thought to discharge primarily to the Boise and Snake Rivers in the western and southwestern parts of the valley.

Aquifer material characteristics, material heterogeneity, and structural controls influence Treasure Valley ground water flow. Coarse-grained materials (e.g., sand and gravel) in upper zones are more capable of transmitting ground water than fine-grained sediments (e.g., silt and clay). Clay and silt in the Snake River sediments can restrict vertical and/or horizontal ground water movement. Perched aquifers are created when fine-grained lenses impede downward vertical flow. A distinctive clay layer, sometimes referred to as "blue clay," is present over large portions of the valley. The clay is absent in the easternmost portions of the lower Boise River Basin, but can reach a thickness of more than 200 feet toward the central and western portions of the basin.

Sequences of interbedded sand, silt, and clay, such as the Deer Flat Surface and the upper portion of the Glenns Ferry Formation of the upper Idaho Group in the Nampa-Caldwell area, are the major water-producing aquifers in a large part of Canyon County (Anderson and Wood, 1981). The coarse-grained sediments in this zone produce water in excess of 2,000 gallons per minute (gpm).

The delineated source water assessment area for the Eugene Outlook Water Corporation can best be described as a southeastward trending corridor approximately four miles long and one-quarter mile wide (Figure 2, page 19). The actual data used by BARR Engineering in determining the source water zones of contribution are available from DEQ upon request.

Section 4. Susceptibility Analysis

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment B (pages 21-22) contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: 1) the surface soil composition, 2) the material in the vadose zone (region between the land surface and the water table), 3) the depth to first ground water, and 4) the presence of a 50-foot thick impermeable zone above the production interval of the well. Slowly draining fine-grained soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel.

For the Eugene Outlook Water Corporation, regional soil information indicates the presence of poor to moderately draining soils in the vicinity. These soils may provide additional protection to the ground water by impeding the downward progress of contaminants in the unlikely event of a spill or release.

The hydrologic sensitivity for the well was moderate (Table 2, page 11). Some hydrologic data was lacking in the susceptibility analysis, because DEQ was unable to obtain a well log for the Eugene Outlook Water Corporation. Therefore, the moderate rating is somewhat conservative.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have a better buffering capacity. In addition, if the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less probable. Also, if the wellhead is protected from surface flooding and is outside the 100-year floodplain, then the likelihood of contamination from surface events is reduced.

A well log could not be located for the Eugene Outlook Water Corporation. Therefore, valuable information regarding the well casing, production intervals, and annular seal could not be incorporated into the analysis. According to the system operator, the well is approximately 135 feet deep and a 12-inch casing protrudes from the ground, but otherwise, the intricacies of the well are unknown. However, the Sanitary Survey performed by the Central District Health Department indicated that the well seal is in compliance, and therefore should provide an initial barrier to precipitation and other surface events. As a result, the well construction score for the Eugene Outlook Water Corporation was moderate (Table 2, page 11).

Potential Contaminant Source and Land Use

In terms of the potential contaminant/land use score, the well rated moderate for IOCs (i.e. nitrates, arsenic), VOCs (i.e. petroleum products), SOCs (i.e. pesticides) and low for microbial contaminants (i.e. bacteria). This rating can be attributed, in part to the predominant land use in the region, which is urban/commercial. Additionally, the potential contaminant sources within the designated source water area contributed to these rankings (Table 1, page 20).

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a repeat detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a wellhead will lead to an automatically high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) and the presence of agricultural land contribute greatly to the overall ranking.

The Eugene Outlook Water Corporation water system could have rated a lower overall susceptibility if a well log could have been incorporated into the analysis. Instead, the system rated a moderate overall susceptibility to all classes of contaminants (Table 2).

Table 2. Summary of the Eugene Outlook Water Corporation Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	M	M	M	M	L	M	M	M	M	M

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

A moderate hydrologic sensitivity and moderate system construction combined to give the well a moderate overall rating for all contaminants, even though few potential contaminant sources exist in the 3-year TOT zone. Though there are no significant water chemistry problems in the ground water, there have been detections of total coliform bacteria and *E. coli* in routine water samples collected from the system. No VOCs or SOCs have ever been detected in the well water. However, the delineated source water area does reside in an area of urban land use. These areas may be vulnerable to ground water contamination due to urban runoff during storm events, improper disposal of household hazardous wastes, and industrial pollutants, to name just a few.

Section 5. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local source water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the Eugene Outlook Water Corporation, drinking water protection activities should first focus on continued maintenance of the sanitary seal and distribution system. Actions should also be taken to keep a 50-foot radius circle clear around the wellhead. Any spills occurring within the delineated drinking water capture zone should be monitored and dealt with expeditiously.

Because a portion of the ground water capture zone is outside the direct jurisdiction of the Eugene Outlook Water Corporation, the creation of partnerships with state and local agencies and industry groups are critical to the success of drinking water protection. The water system may want to cooperate with the businesses within the delineation to encourage the use of pollution prevention methods and specific best management practices (BMPs). In addition, if microbial contamination should become a persistent problem, appropriate disinfection practices would need to be implemented to ensure the health of the Eugene Outlook Water Corporation residents.

Also, because of the new, more rigid arsenic standard, the system may want to take proactive measures in preparing for the new MCL of 10 ppb. Compliance with the new arsenic MCL will be required for all water systems by 2006. Recent documentation from the EPA indicates that federal monies will likely be available to assist small water systems in implementing engineering controls to meet the new standard.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan, especially since the delineation contains some urban and residential land uses. Public education topics could include proper lawn care practices, household hazardous waste disposal methods, and the importance of water conservation to name but a few.

There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. In addition, because the delineation envelops many roads in the downtown Boise region, the Idaho Department of Transportation should be involved in any protection measures. Drinking water protection practices dealing with agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Ada County Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office	(208) 373-0550
State DEQ Office	(208) 373-0502

Website: http://www2.state.id.us/deq

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at 1-800-962-3257 for assistance with wellhead protection strategies.

Petrich, C.R. and J.H. Hutchings (IWRRI), S.M. Urban and R.A. Carlson (IDWR), 1999. "Progress Report on the Characterization of Treasure Valley Ground Water Resources – Draft," prepared for and in cooperation with the Idaho Department of Water Resources, June 30, 1999.

Squires, E., Wood, S.H. and Osiensky, J.L., 1992. Hydrogeologic Framework of the Boise Aquifer System, Ada County, Idaho, Research Technical Completion Report, Idaho Water Resources Research Institute, University of Idaho. 114 pp.

Wood, S.H., 1994. Seismic expression and geological significance of a lacustrine delta in Neogene deposits of the Western Snake River Plain, Idaho. AAPG Bulletin, 1(January): p. 102-121.

Wood, S.H. and Anderson, J.E., 1981. Part 11: Geological, hydrological, and geochemical and Geophysical investigations of the Nampa-Caldwell and adjacent areas, southwestern Idaho. In: J.C. Mitchell (Editor), Geothermal investigations in Idaho. Idaho Department of Water Resources.

Wuolo, R.W., J. Wittman, and D.M. Reynolds, 2001. "Summary Report: Delineation of Public Drinking Water Sources for the Source Water Assessment Program: Boise Valley and Mountain Home Plateau," BARR, Minneapolis, August 2001.

Attachment A

Delineation Figures and Potential Contaminant Source Table for the Eugene Outlook Water Corporation

FIGURE 1: Geographic Location of the Eugene Outlook Water Corp.

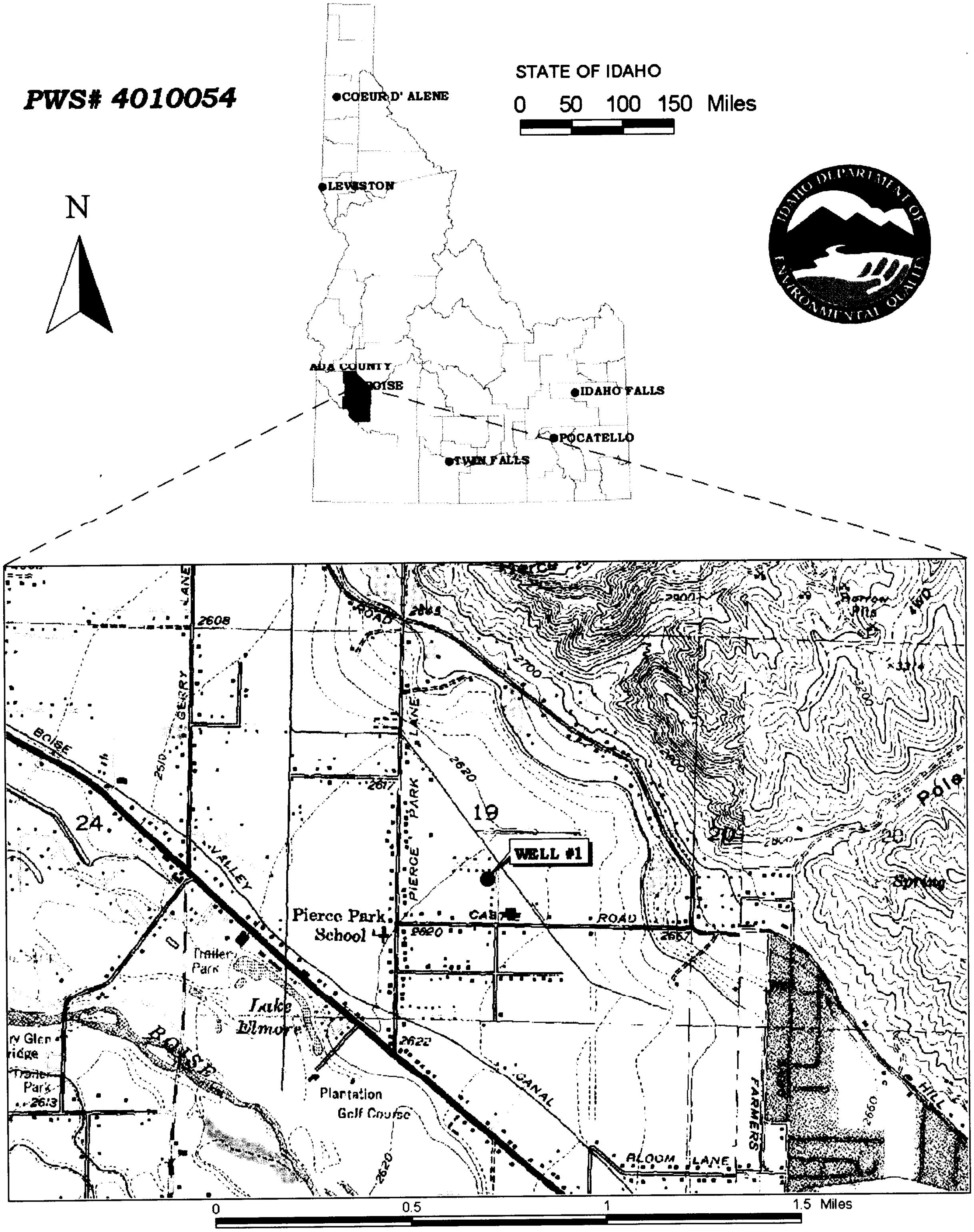

FIGURE 2 - Eugene Outlook Water Corp Delineation Map and Potential Contaminant Source Locations

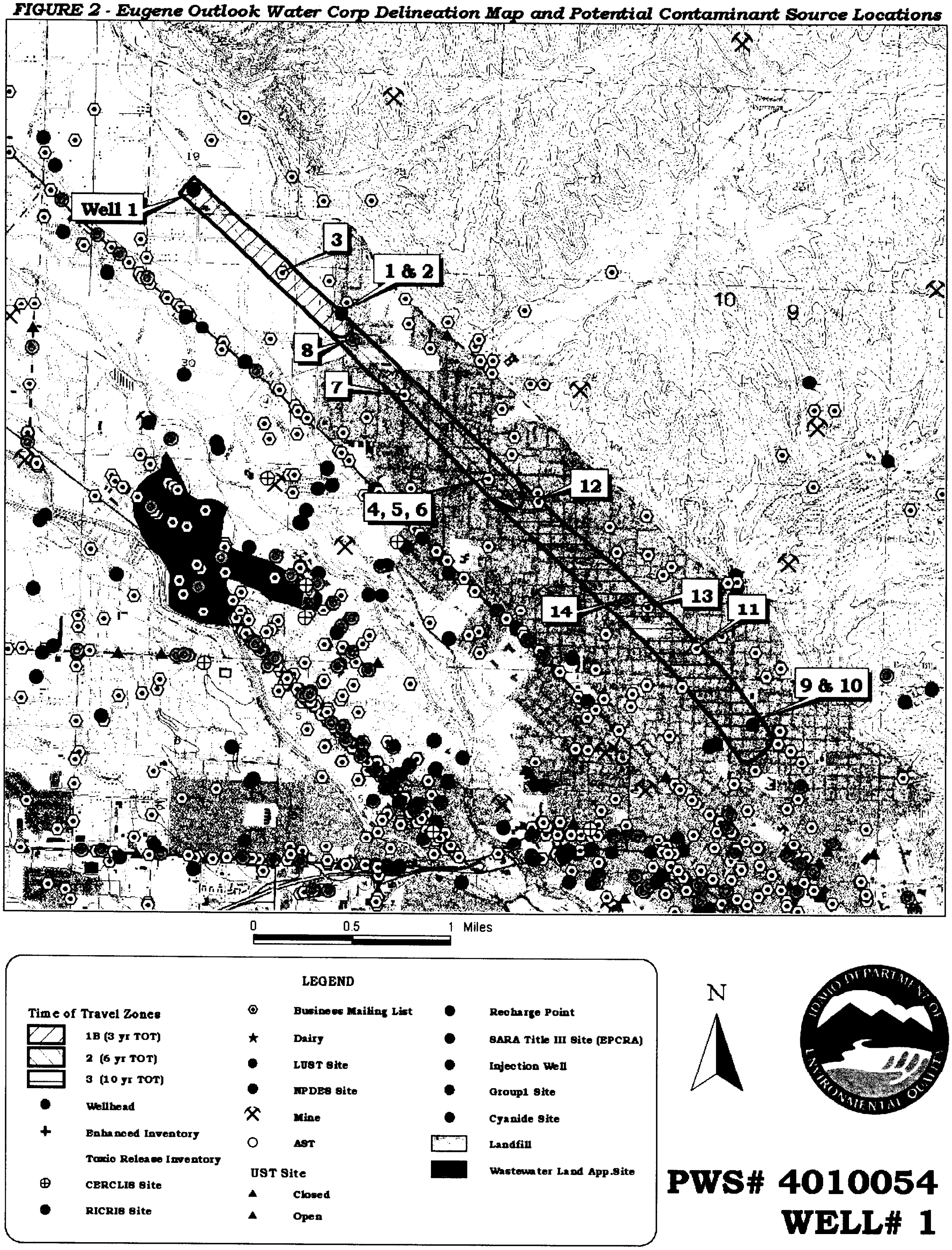

Table 1. Eugene Outlook Water Corporation Potential Contaminant Inventory

SITE #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
	City Sewer Line	0-3	GWUDI field survey	IOC, Microbes
1,2	LUST/UST	0-3	Database Search	VOC, SOC
3	Building Contractor	0-3	Business Mailing List	IOC, VOC, SOC
4,5	Automobile Service Shop & UST	3-6	Database Search	IOC, VOC, SOC
6	Metal Stamping Manufacturers	3-6	Business Mailing List	IOC, VOC, SOC
7	Well Drillers	3-6	Business Mailing List	IOC, VOC, SOC
8	RCRIS Site-Trucking Company	3-6	Database Search	IOC, VOC, SOC
9,10	LUST/UST-Gas Station	6-10	Database Search	VOC, SOC
11	Landscape Contractor	6-10	Business Mailing List	IOC, SOC
12	Tree Nursery	6-10	Business Mailing list	IOC, SOC
13	Lawn & Garden Equipment Supply	6-10	Business Mailing List	IOC, SOC
14	RCRIS Site	6-10	Database Search	IOC, VOC, SOC

[1] **Find Source Description definitions on page 14**
[2] **TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead**
[3] **IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

NOTE: The site number in this table corresponds to Figure 2, page 19.

Attachment B

Eugene Outlook Water Corporation Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report   Public Water System Name : EUGENE OUTLOOK WATER CORP   Well# : WELL #1

Public Water System Number 4010054   11/28/01 3:32:56 PM

		SCORE			
1. System Construction					
Drill Date	circa 1959				
Driller Log Available	NO				
Sanitary Survey (if yes, indicate date of last survey)	YES	2001			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
	Total System Construction Score	4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	YES	0			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
	Total Hydrologic Score	4			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	2	2	2	1
(Score = # Sources X 2) 8 Points Maximum		4	4	4	2
Sources of Class II or III leacheable contaminants or	YES	1	2	0	
4 Points Maximum		1	2	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		5	6	4	2
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		12	13	11	4
4. Final Susceptibility Source Score		10	11	10	10
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate